SYNOPSIS OF THE FLORIDA SPECIES OF *PECTIS* (ASTERACEAE)

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ABSTRACT

A key, descriptions, revised nomenclature, range statements and maps are presented for the species of *Pectis* known to occur in Florida. A new combination, **Pectis glaucescens**, is published for the plant formerly known as *P. leptocephala*. A naturally occurring triploid interspecific hybrid, **Pectis × floridana** (*P. glaucescens* × *P. prostrata*), is described and illustrated.

Four species of *Pectis* (Asteraceae) have been reported to occur in Florida: *P. humifusa*, *P. leptocephala*, *P. linearifolia*, and *P. prostrata* (Fernald 1897; Rydberg 1916; Small 1933; Keil 1975; Long and Lakela 1976; Cronquist 1980; Wunderlin 1982). Systematic investigations of *Pectis* necessitate some taxonomic changes for the species occurring in Florida. An examination of type specimens deposited in the herbarium of the Museum National d'Histoire Naturelle (P) revealed that the basionym of *P. leptocephala* is predated by an earlier available epithet and that a nomenclatural change is required. Recent field studies have revealed the presence of a heretofore unrecognized natural interspecific hybrid that closely resembles *Pectis linearifolia*. The range of several species is greater than indicated in local and regional manuals (e.g., Anderson 1984).

PECTIS L., Syst. Nat. Ed. 10. 1221. 1759. TYPE: *P. linifolia* L.

Tap-rooted or fibrous-rooted annual or perennial herbs. Stems prostrate to erect, often several arising together from the base, straw-colored to deep purplish brown, often diffusely branched, glabrous to puberulent. Leaves opposite, linear to oblanceolate, connected at the base by a narrow connate rim, proximally ciliate with slender bristles, dotted on the undersurface with pellucid glands containing scented oils or unscented compounds, glabrous or minutely puberulent on the margin and midvein. Heads radiate, solitary or in open to condensed cymose clusters, the peduncles bearing one to several alternate scale-like bractlets. Involucres cylindric to fusiform or campanulate; phyllaries in a single series, of equal length, distinct or cohering in the proximal 1 mm, linear to obovate, the margins narrowly

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hyaline, often overlapping, acute to rounded, the abaxial surface with a prominent, proximally gibbous keel, dotted or streaked with glands, usually ciliolate distally, glabrous or puberulent. Receptacle flat or hemispherical, naked, shallowly pitted. Ray florets pistillate and fertile, equal in number to the phyllaries and individually inserted on the phyllary bases rather than the receptacle; corollas yellow, often suffused with red in age, the tube slender, the ligule elliptical, entire or shallowly 2 – 3-lobed. Disk florets perfect; corollas yellow, the tube slender, gradually expanded to the throat, the limb (in Florida species) bilabiate with a 1-lobed anterior lip and a 4-lobed posterior lip; stamens (in Florida species) 5, included, the apical anther appendages very short, rounded or emarginate; style included or exserted, the branches very short, papillose. Achenes cylindrical, black or dark brown, variously puberulent with 2-celled trichomes. Pappus of lanceolate to setiform scales, awns or bristles, sometimes reduced to a low crown. Chromosome base number: $x = 12$.

About 85 species ranging from California, Nebraska and Florida south through much of Latin America to the Galapagos Islands, northern Argentina and the West Indies. In Florida, more frequent from mid-peninsular regions southward, uncommon in the panhandle region (Fig. 1).

KEY TO THE SPECIES OF *PECTIS* IN FLORIDA

1. Heads borne on slender peduncles mostly 5 – 35 mm long.
   2. Foliar glands all or mostly in marginal row; phyllaries falling individually, not coherent at base; achenes seed-bearing. . . . . 1. *P. glaucescens*
   2. Foliar glands submarginal and scattered over the undersurface of the blade; phyllaries coherent at base, falling together with the enclosed achenes; achenes with abortive ovules. . . . . 3. *P.* × *floridana*
1. Heads sessile or borne on peduncles mostly less than 3 mm long.
   3. Involucres campanulate; phyllaries obovate, 2 – 4 mm wide; disk florets 12 – 21. . . . . 5. *P. humifusa*
   3. Involucres cylindrical to fusiform; phyllaries linear to oblong, 1 – 2.5 mm wide; disk florets 4 – 10.
      4. Leaves mostly more than 2 mm wide; heads fusiform; foliar glands very numerous, scattered on the undersurface of the leaves; herbage not scented. . . . . 4. *P. prostrata*
      4. Leaves mostly 1 – 1.5 mm wide; heads cylindrical; herbage scented.
         5. Phyllaries prominently keeled, cohering at base and falling together with the enclosed achenes; achenes with abortive ovules; herbage spicy-scented. . . . . 3. *P.* × *floridana*
         5. Phyllaries nor prominently keeled, falling individually; achenes seed-bearing; herbage lemon-scented. . . . . 2. *P. linearifolia*

1. PECTIS **glaucescens** (Cassini) Keil, comb. nov. *Chthonia glaucescens* Cassini, Dict. Sci. Nat. 9:174. 1817. TYPE: of unknown origin (HOLOTYPE: P-JU!).

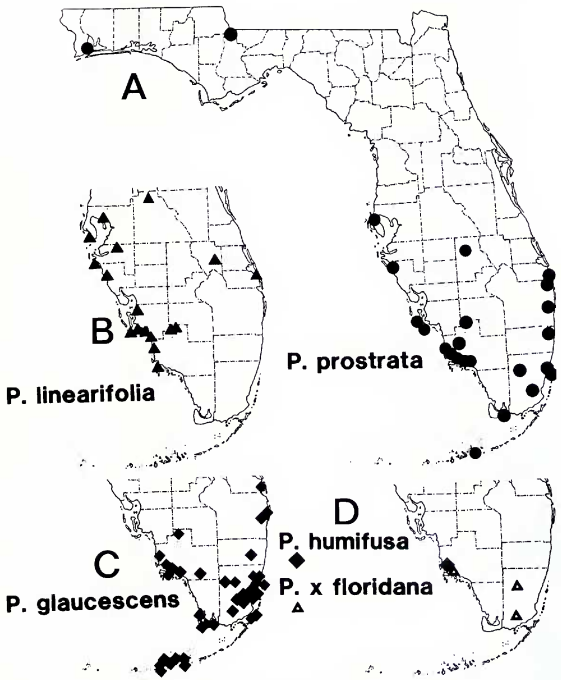

Figure 1. Distribution of *Pectis* species in Florida. A. *P. prostrata* Cav. B. *P. linearifolia* Urban. C. *P. glaucescens* (Cass.) Keil. D. *P. humifusa* Swartz and *P.* × *floridana* Keil.

Chthonia leptocephala Cassini, Dict. Sci. Nat. 27:206. 1823. TYPE: of unknown origin (HOLOTYPE: [according to Cassini] in the Desfontaines herbarium at P, but not located during my visit in 1985). *Pectis leptocephala* (Cassini) Urban, Symb. Antil. 5:280. 1907.

Pectis lessingii Fernald, Proc. Amer. Acad. Arts 33:67. 1897. TYPE: UNITED STATES: FLORIDA: Dade Co.: between the Everglades and Biscayne Bay, *Curtis 1162* (LECTOTYPE: GH !; ISOLECTOTYPES: BM!, CM!, F!, K!, M!, MICH!, NY (2)!, P!, US!). The lectotype is here chosen from seven syntypes.

Spicy-scented annuals (sometimes persisting and becoming subligneous at base), simple to much-branched from the base, sometimes mat-forming but not radicant. Stems slender, erect to prostrate, 2 – 50 cm long, cymosely much-branched, sparsely to densely puberulent, sometimes glabrate. Leaves narrowly linear, 1 – 3.5 cm long, 0.2 – 1.8 mm wide, mucronulate or setose-tipped, often revolute, proximally ciliate with 1 – 5 pairs of bristles 1 – 2 mm long, submarginally punctate on the abaxial surface with broadly elliptic to circular glands 0.2 – 0.3 mm diameter, sometimes with additional scattered glands, minutely scaberulous on the margins, otherwise glabrous. Heads solitary or in diffuse few- to many-headed cymose clusters; peduncles filiform (3-)7 – 35 (-54) mm long, with 2 – 5 slender, scale-like bractlets 0.5 – 1.5 mm long. Involucres cylindric; phyllaries 5, distinct, falling individually from the receptacle at maturity, linear-oblanceolate, 4 – 5 mm long, obtuse to acute, slender-keeled to near the apex, often bowed-out near the middle, sparsely punctate with elliptical glands 0.1 -0.2 mm long, distally ciliolate, otherwise glabrous. Ray florets 5; corollas 3 – 5 mm long, the narrow ligule 2 – 3.5 mm long, often involute when dry. Disk florets 3 – 7; corollas 2 – 3 mm long; anthers 1 mm long. Ray and disk achenes similar, 2.5 – 3 mm long, antrorsely strigillose. Pappus variable, composed of 0 – 5 antrorsely scabrid bristles or slender scales 1 – 2 mm long, and 0 – 5 entire to irregularly lacerate scales 0.2 – 0.7 mm long. Chromosome number: $n = 24$.

Common and widespread in southern Florida and the Bahamas; also in Hispaniola and Jamaica. In Florida it occurs from Glades and Martin counties south to Key West (Fig. 1-C). Flowering specimens have been collected throughout the year. *Pectis glaucescens* is most common on limestone soils in open grassy sites. Various types of human disturbance, particularly road construction, have created habitats suitable for these plants, and in places this species is an abundant roadside weed. It also occurs as a lawn weed in the Miami area and probably elsewhere.

2. PECTIS LINEARIFOLIA Urban, Symb. Antil. 5:276. 1907. TYPE: UNITED STATES: FLORIDA: Hillsborough Co.: Tampa, *Nash 2479* (LECTOTYPE: US!; ISOLECTOTYPES: E!, GH!, K!, LE!, MO (2)!, MSC!, NY!, P (2)!, PR!, UC!, WU!). The lectotype is here designated from isosyntypes. Urban designated two syntypes,

one from Florida and the second from Jamaica. Both specimens were apparently destroyed when the Berlin herbarium burned during World War II. I am excluding the Jamaican collection (JAMAICA: without locality, *MacFayden s.n.* (GOET! [fragment], K!), which is actually *P. glaucescens*.

Lemon-scented annuals, simple or much-branched from the base. Stems slender, erect to decumbent, 4 – 40 cm long, puberulent, the upper branches mostly short. Leaves linear, 1 – 5 cm long, 1 – 3 mm wide, mucronate or setose-tipped, often revolute, proximally ciliate with 2 – 6 pairs of bristles 1 – 2.5 mm long, submarginally punctate on the abaxial surface with round glands 0.2 – 0.4 mm diameter, scaberulous on the margins, otherwise glabrous. Heads solitary or in congested terminal and axillary leafy-bracted cymose clusters, sessile or on peduncles up to 1 mm long. Involucre cylindric to narrowly campanulate; phyllaries 5, distinct, falling individually from the receptacle at maturity, linear or linear-oblanceolate, 5 – 6 mm long, 1 – 1.5 mm wide, acute, indurate-keeled in the proximal half, punctate with scattered elliptical glands 1 – 2 mm long, apically ciliolate, otherwise glabrous. Ray florets 5; corollas 4.5 – 5.5 mm long, the narrow ligules 3 – 4 mm long, often involute when dry. Disk florets 4 – 10; corollas 2.5 – 3 mm long; anthers 0.6 – 1 mm long. Ray and disk achenes similar, 2.25 – 3.25 mm long, antrorsely strigillose. Pappus of ray and disk achenes similar, composed of 2 – 5 antrorsely barbed bristles or slender scales 1.5 – 2.5 mm long and several shorter barb-margined scales. Chromosome number: $n = 24$.

Endemic to mid-peninsular Florida from Pinellas Co. and northern Polk Co. east to Martin Co. and south to northern Collier Co. (Fig. 1-B). The main flowering period is from August to December, but this species sometimes flowers in the spring months as well. The distribution of *P. linearifolia* is mostly to the north of that of *P. glaucescens*. Both species occur in open sandy or gravelly soils with grasses and other low herbs. I have seen the two together at only one site (along a railroad and roadside in Martin Co.) and observed no hybrids. It is likely that the two taxa grow together at other sites as well. *Pectis linearifolia* is represented by fewer and more widely scattered collections than is *P. glaucescens* and is apparently less common.

3. Pectis × **floridana** Keil, nothosp. nov. (Fig. 2).

E ceteris speciebus Floridae numero triploideo chromosomatum et acheniis sterilibus differt. E *P. prostrata* foliis angustioribus, capitulis gracilioribus et oleis essentialibus graveolentibus et E *P. glaucescens* glandibus foliorum dispersis, pedunculis brevioribus et phyllariis proximale coherentibus distinguitur. E *P. linearifolia* phyllariis proximale coherentibus et valde carinatis, pedunculis longioribus et odoris oleorum essentialium separari potest.

Spicy-scented annuals, simple or much-branched from the base, often mat-forming and sometimes radicant. Stems slender, erect to decumbent, 5 – 30 cm long, puberulent. Leaves linear, 1.5 – 3.5 cm long, 1 – 2 mm wide, punctate on the abaxial surface with numerous scattered glands ca 0.2 mm diameter, scaberulous on the margins, otherwise glabrous. Heads solitary or in condensed axillary and terminal cymose clusters; peduncles filiform, 5 – 25 mm long, bearing 1 – 4 scale-like bractlets. Involucre cylindric to narrowly fusiform; phyllaries 5, coherent at base and falling as a group together with the enclosed achenes, linear or linear-oblanceolate, 5 – 7 mm long, 1 – 2 mm wide, subacute, strongly indurate-keeled to near the apex, punctate with scattered oval glands 0.2 – 0.3 mm long, ciliolate apically, otherwise glabrous. Ray florets 5; corollas 3.5 – 4.2 mm long, the narrow ligule 2 – 2.7 mm long, often involute when dry. Disk florets 4 – 6; corollas 2.5 mm long, the anthers ca 1 mm long. Ray and disk achenes similar, 3 – 3.5 mm long, strigillose to short pilose, the pericarp darkening but not swelling, the ovule abortive and shrunken. Pappus of 2 (ray) or 5 (disk) slender, antrorsely scabrid, setose-tipped scales 2 – 2.5 mm long, sometimes with one or more additional shorter scales or bristles. Chromosome number: $3n = 36$.

TYPE: UNITED STATES: FLORIDA: Collier Co.: 6 mi SE of Royal Palm Hammock along US 41, 18 Nov 1982, *Keil 16488* (HOLOTYPE: FTG; ISOTYPES: to be distributed).

Known at present from Collier and Dade counties (Fig. 1-D). The individuals collected at these sites were in flower in November and had evidently been flowering for at least two months.

Additional specimens examined: FLORIDA: Dade Co.: along US 41, 18 mi W of Florida Turnpike, *Keil 16476* (OBI); Everglades National Park at Pa Hay Okee Overlook, *Gillis 7121* [mixed with *P. glaucescens*] (IJ).

Pectis × *floridana* is apparently a first generation hybrid between *Pectis glaucescens* and *P. prostrata*. Second generation hybrids and backcrosses have not been discovered. In south peninsular Florida, the two parental taxa are known to grow together at several locations. At two sites where I encountered mixed populations of these species, I observed morphologically intermediate individuals that I at first mistook for *P. linearifolia*. However, chromosome counts of the two species and the intermediates plus the characters of these plants demonstrate that the intermediates are hybrids. *Pectis prostrata* is a diploid and *P. glaucescens* is a tetraploid. The resemblance to *P. linearifolia* is apparently coincidental (Keil 1983). The hybrids are triploids and apparently are completely sterile. Meiosis is very irregular. Pollen grains are malformed and variable in size, and have 0 percent stainability in cotton blue in lactophenol (400 grains counted).

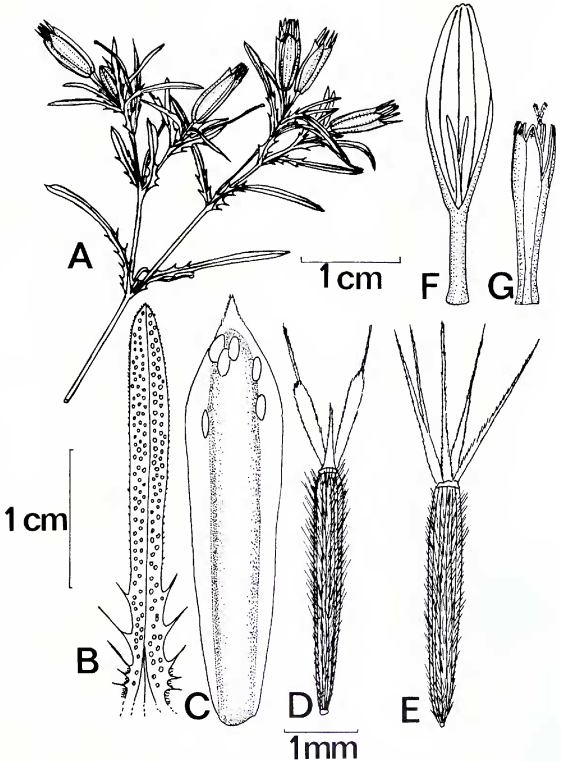

Figure 2. *Pectis* × *floridana* Keil. A. Branchlet with heads. B. Principal foliage leaf. C. Phyllary. D. Ray achene. E. Disk achene. F Ray corolla. G. Disk corolla. C-G, same scale.

Regeneration of the hybrids from season to season apparently requires new hybridization events. There is apparently no barrier to hybridization between *P. prostrata* and *P. glaucescens*. At the type locality the hybrids were almost as common as the parental taxa. At this site the plants formed a dense mixed roadside population, and the branches of individuals of the two parental species and the hybrids frequently were intertangled. Hybrid individuals were apparently as healthy and vigorous as the parents. *Pectis* × *floridana* can be expected in other areas where the two parents occur together.

The triploid hybrids are the potential progenitors of a new hexaploid species. Polyploidy is common in the species of *Pectis* of the Caribbean region. Both parental taxa are facultatively autogamous, and a fertile hexaploid, if formed, would very likely retain this capacity, thus enabling it to establish a population even if it were surrounded by individuals of the parental taxa.

4. PECTIS PROSTRATA Cavanilles, Icon. Descr. Pl. 4:12. 1797. TYPE: grown at the Madrid Botanical Garden from seed collected by Nee in Queretaro, Mexico (HOLOTYPE: MA, photo OBI!). *Chthonia prostrata* (Cavanilles) Cassini ex Steudel, Nom. Bot. 598. 1821, pro syn.

Lorentea prostrata Lagasca, Gen. Sp. Pl. 28. 1816. TYPE: CUBA: without location, *Boldo s.n.* (HOLOTYPE: MA, photo OBI!).

Pectis costata Ser. & Merc. ex DC., Prodr. 5:100. 1836. TYPE: CUBA: without location, *Sagra s.n.* (HOLOTYPE: G-DC!; ISOTYPE: P!).

Pectis prostrata Cavanilles var. *urceolata* Fernald, Proc. Amer. Acad. arts 33:68. 1897. TYPE: MEXICO: CHIHUAHUA: Hacienda San Jose, *Palmer 53* (HOLOTYPE: GH!; ISOTYPES: BM!, K!, LE!, NY!). *Pectis urceolata* (Fernald) Rydberg, N. Amer. Fl. 34:197. 1916.

Pectis multisetosa Rydb., N. Amer. Fl. 34:198. 1916. TYPE: GUATEMALA: SANTA ROSA: Chupadero, *Heyde and Lux 4232* (HOLOTYPE: NY!; ISOTYPES: F!, UC! [fragment]).

Unscented annuals, simple or much-branched from the base, often mat-forming and sometimes radicant. Stems slender, erect to prostrate, 1 – 30 cm long, often much-branched, sparsely to densely puberulent. Leaves linear to oblong or narrowly oblanceolate, 1 – 3 cm long, 1.5 – 5 mm wide, obtuse to subacute, mucronate, proximally ciliate with 4 – 12 pairs of bristles 1 – 3 mm long, densely punctate on the undersurface with scattered round glands 0.1 – 0.2 mm diameter, scaberulous on the margins, proximally villous-ciliolate, otherwise glabrous. Heads solitary, sessile or subsessile in dense terminal or axillary cymose clusters; peduncles up to 2 mm long, bearing 1-several scale-like bractlets. Involucres cylindrical or fusiform; phyllaries 5, coherent at base and falling as a group together with the enclosed achenes, oblong to narrowly obovate, 5 – 6.5

mm long, 1.5 − 2.5 mm wide, obtuse to subacute, strongly indurate-keeled to near the apex, punctate with scattered oval glands 0.1 − 0.2 mm long, ciliolate apically, otherwise glabrous. Ray florets 5; corollas 2.5 − 3.5 mm long, the narrow ligule 1.5 − 2 mm long, often involute when dry. Disk florets 3 − 6; corollas 2 − 2.5 mm long, the anthers ca 1 mm long. Ray and disk achenes similar, 2.5 − 3.5 mm long, strigillose to short pilose. Pappus of 2 (ray) or 5 (disk) lanceolate scales 1.5 − 2 mm long. Chromosome number: $n = 12$.

Widespread from the southwestern United States south throughout much of Mexico and Central America and from Florida to the Bahamas, Cuba, Hispaniola and Puerto Rico. In Florida, known from the panhandle region in Escambia and Gadsden counties and in the peninsula in scattered locations from Pinellas and Highlands counties south into the Keys (Fig. 1-A). Flowering mostly from August to December. This species is probably more widespread than present records indicate. It is often overlooked or ignored because it is a rather unattractive roadside weed. In my field studies in southern Florida I found it to be common in disturbed habitats.

Pectis prostrata is a variable species represented in Florida by comparatively small-headed plants. Larger headed plants occur in some areas of Mexico and Central America. It is not certain whether this species is indigenous in Florida or introduced from some other region. The first collections from the state were made in the 1840's but by that time Florida had been a part of Spain's commercial shipping network for several hundred years. *Pectis prostrata* is rather weedy and its occurrence on the islands of Hispaniola and Puerto Rico are probably a result of human introduction. It is facultatively autogamous and readily pioneers roadsides and other disturbed open habitats. It is apparently spreading along roadsides and can be expected to become even more common in Florida in the future. This species may spread to Georgia or Alabama if the population sampled in Gadsden County (*Anderson 4573*) persists. This collection site is approximately 10 miles from the Florida-Georgia state line.

5. PECTIS HUMIFUSA Swartz, Prodr. 114. 1788. TYPE: VIRGIN ISLANDS: ST. CROIX [Santa Cruz]: without location, *Swartz s.n.* (LECTOTYPE: BM!; ISOLECTOTYPE: G-DC!). The lectotype is here chosen from syntypes. *Chthonia humifusa* (Swartz) Cassini ex Steudel, Nom. Bot. 598. 1821, pro syn. *Lorentea humifusa* (Swartz) Lessing, Linnaea 6:719. 1831.

Chthonia repens Cassini, Dict. Sci. Nat. 27:204. 1823. TYPE: PUERTO RICO: without location, *Sagra s.n.* (HOLOTYPE: P-JU!; ISOTYPES: P!, P-LA!).

Pectis sieberi Lessing, Linnaea 6:717. 1831. TYPE: FRENCH WEST INDIES: Martinique, *Sieber 24* (HOLOTYPE: CW?; ISOTYPES: HAL!, JE!, K!, L!, M!, MO!, NY!, P (2)!, PR!, WU!).

Pectis serpyllifolia Lessing, Linnaea 6:715. 1831. TYPE: PUERTO RICO: without location, *Wydler 208* (LECTOTYPE: G-DC!; ISOLECTOTYPES; E!, K!, L!, OXF!, S!, TCD!). The lectotype is here chosen from four syntypes.

Non-scented mat-forming annuals or often perennials, the base often more or less woody. Stems several to many from the base, 2 – 25 cm long, prostrate, much-branched, densely leafy, often strongly radicant, puberulent. Leaves oblong-oblanceolate to obovate, 3 – 17 mm long, 1.5 – 4 mm wide, obtuse, mucronulate, proximally ciliate with 2 – 6 pairs of bristles 1 – 2 mm long, the bases sheathing, on both surfaces punctate with numerous scattered round glands 0.1 – 0.2 mm diameter, scaberulous on the margins, proximally villous-ciliolate, otherwise glabrous. Heads terminal and axillary, solitary or in few-headed cymes, sessile or on slender peduncles 1 – 12 mm long with 2 – 3 scale-like bractlets. Involucres campanulate; phyllaries 5, obovate, 4.5 – 6 mm long, 2 – 4 mm wide, broadly overlapping, broadly obtuse, indurate-keeled in the proximal 1/2 or 2/3, densely punctate with numerous scattered tiny glands, apically ciliolate, otherwise glabrous. Ray florets 5; corollas 3.5 – 5 mm long, the tube 1 – 2 mm long and the narrow ligules 2.5 – 3 mm long. Disk florets 12 – 21; corollas 2.5 – 3 mm long; anthers ca 1 mm long. Achenes 2.5 – 4 mm long, puberulent with trichomes 0.2 – 0.5 mm long, the ray achenes abaxially glabrous. Ray pappus of 2 – 3 slender, antrorsely scabrid, bristle-tipped scales 1.5 – 2.5 mm long and 2 – 10 shorter lacerate-margined scales or slender bristles. Disk pappus of 4 – 15 antrorsely scabrid bristles or slender scales 2 – 3 mm long and up to 15 shorter bristles or scales. Chromosome number: $n = 36$.

From Puerto Rico eastward and southward throughout the Lesser Antilles to the coast of Surinam. Known in Florida from a single collection in 1956 from Collier County (Fig. 1-D) where it is probably adventive (Keil 1975). Efforts in 1982 to relocate the collection site were unsuccessful and it is not known whether this species has persisted in Florida.

SPECIES LIKELY TO DISPERSE TO FLORIDA

Several other species of *Pectis* are common in the West Indies and may eventually disperse to Florida. *Pectis linifolia* var. *linifolia* is a very common and widespread taxon found on most of the islands of the West Indies including the Bahamas. It is a tall, slender, unscented plant with a pappus of stout awns. *Pectis elongata* var. *floribunda* is an erect, bushy-branching, lemon-scented herb found in both the Greater and Lesser Antilles. *Pectis tenuicaulis*, ranging from Venezuela and Colombia to the Dominican Republic, Puerto Rico and several islands of the Lesser Antilles, is similar to *Pectis prostrata* but has 3-rayed instead of 5-rayed heads. *Pectis ciliaris* occurs

in northern South America and the Greater Antilles. It resembles *P. prostrata* but it is a tetraploid. In *P. ciliaris* the phyllaries are less-prominently keeled than in *P. prostrata* and fall separately.

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